

ACCESSING CORS DATA

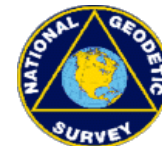


ACCESSING CORS DATA & METADATA

- Web address =
<http://www.ngs.noaa.gov/CORS/>
- Metadata = data about data
- CORSAGE = CORS Amiable Geographic Environment



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

CORSAGE

CORS Web Page


CORS - Continuously Operating Reference Stations - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.ngs.noaa.gov/CORS/

Getting Started Latest Headlines

CORS - Continuously Operating Refer...



National Geodetic Survey

Newsletter

Downloads

Site Metadata

General Information

Cooperative CORS

California CORS


Instructions

GPS Links

Utilities



CORS Home

Contact Us



National and Cooperative CORS

Products/Services Data Sheets Search



NGS NOAA

[opus](#) | [coop cors](#) | [map](#) | [dynamic map](#) | [newsletter](#) | [standard download](#) | [ufcors](#) | [cors ftp](#) | [coordinates](#)

National Geodetic Survey - CORS

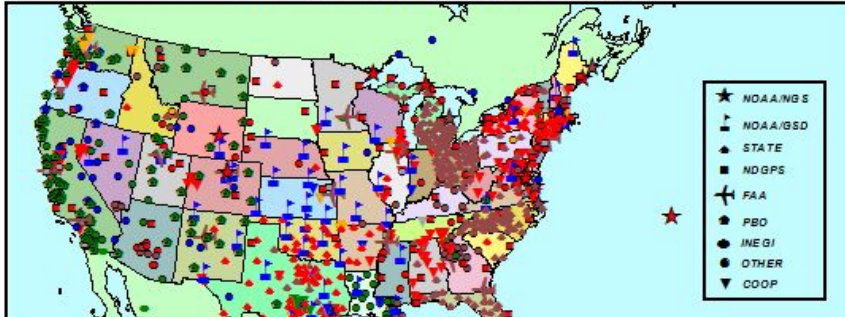
Continuously Operating Reference Stations

[What is CORS?](#) | [Notices](#) | [CORS Site Guidelines](#) | [Future Sites](#) | [List Sites](#)

[OPUS](#) | [User Friendly CORS](#)

Enter SiteID

CORS Coverage - November 2006



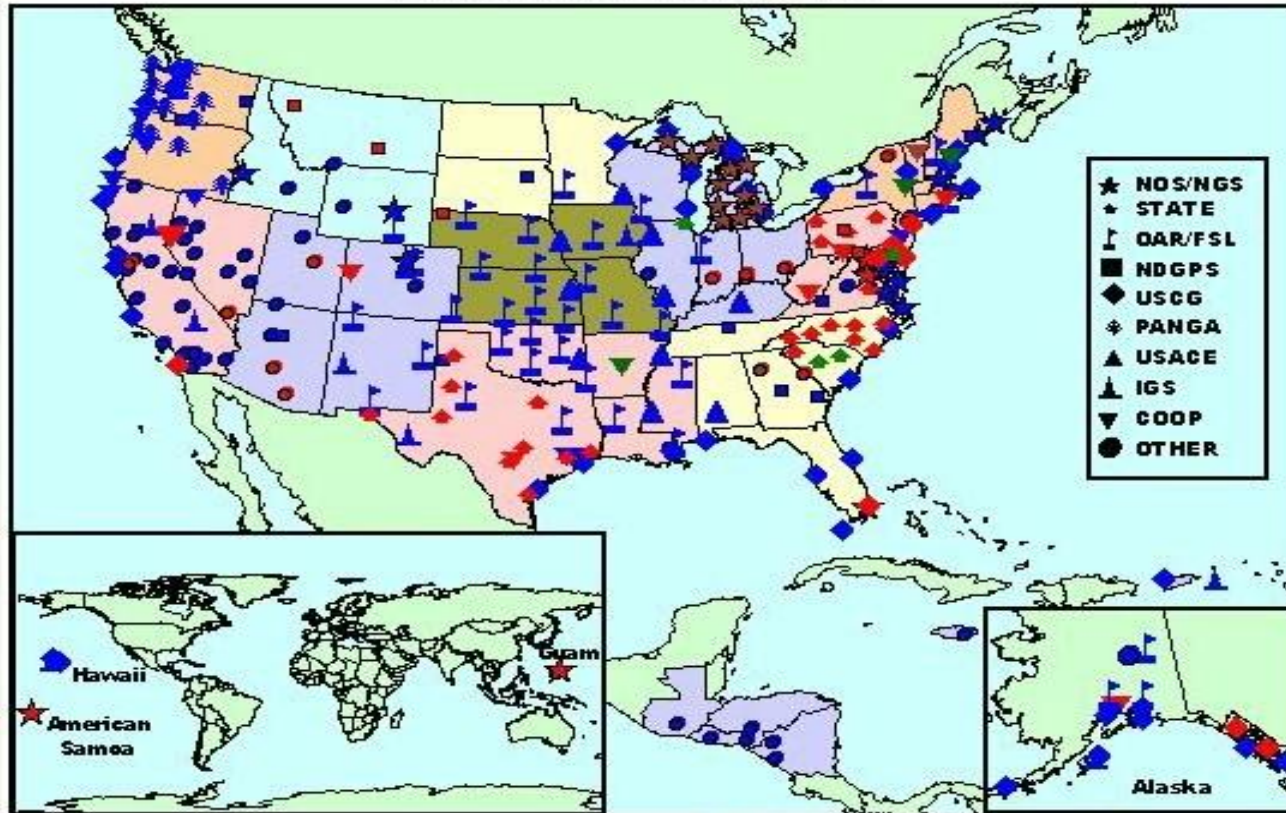
- ★ NOAA/NGS
- ▲ NOAA/GSD
- STATE
- ◆ NCGPS
- ✚ FAA
- PBO
- INEGI
- OTHER
- ▼ COOP

Done

CORSAGE

Network Map

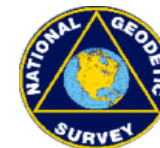
CORS Coverage - November 2001



Symbol color denotes sampling rates: (1 second) (5 seconds) (15 seconds) (30 seconds)

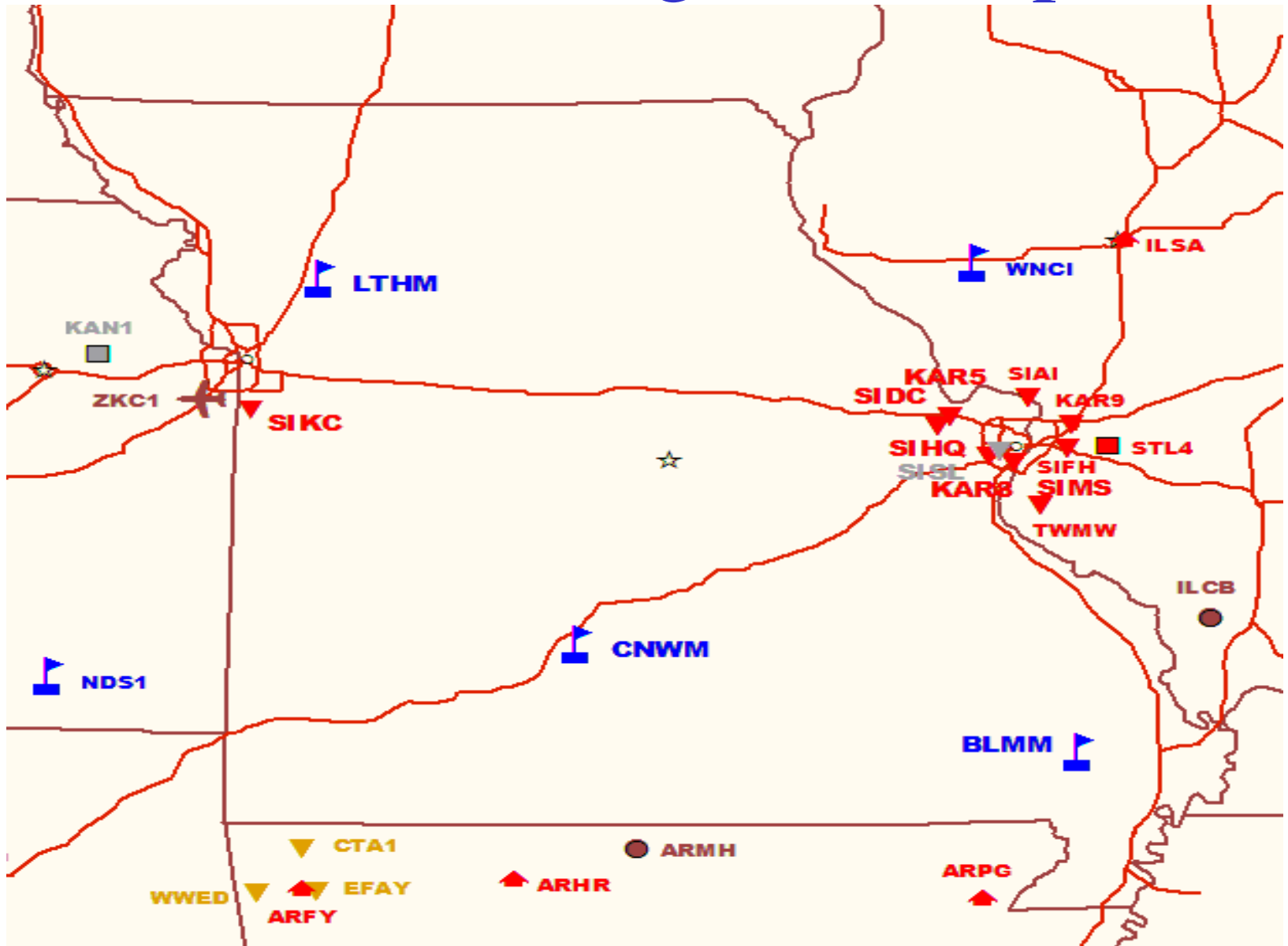


NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

CORSAGE Regional Map



stl4 map - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.ngs.noaa.gov/cgi-cors/corsage.prl?site=STL4

Getting Started Latest Headlines

stl4 map

STL4
ST. LOUIS 4
Summerfield, IL

Site operated by:
[U.S. Coast Guard](#)

[Coordinates](#)
[Data Sheet](#)
[SiteLog](#)
[Photographs](#)
[Notices](#)


[Data Availability](#)
[Standard Files](#)
[Custom Files \(UFCORS\)](#)

[Time Series \(60-day\)](#)
[Time Series \(longterm\)](#)

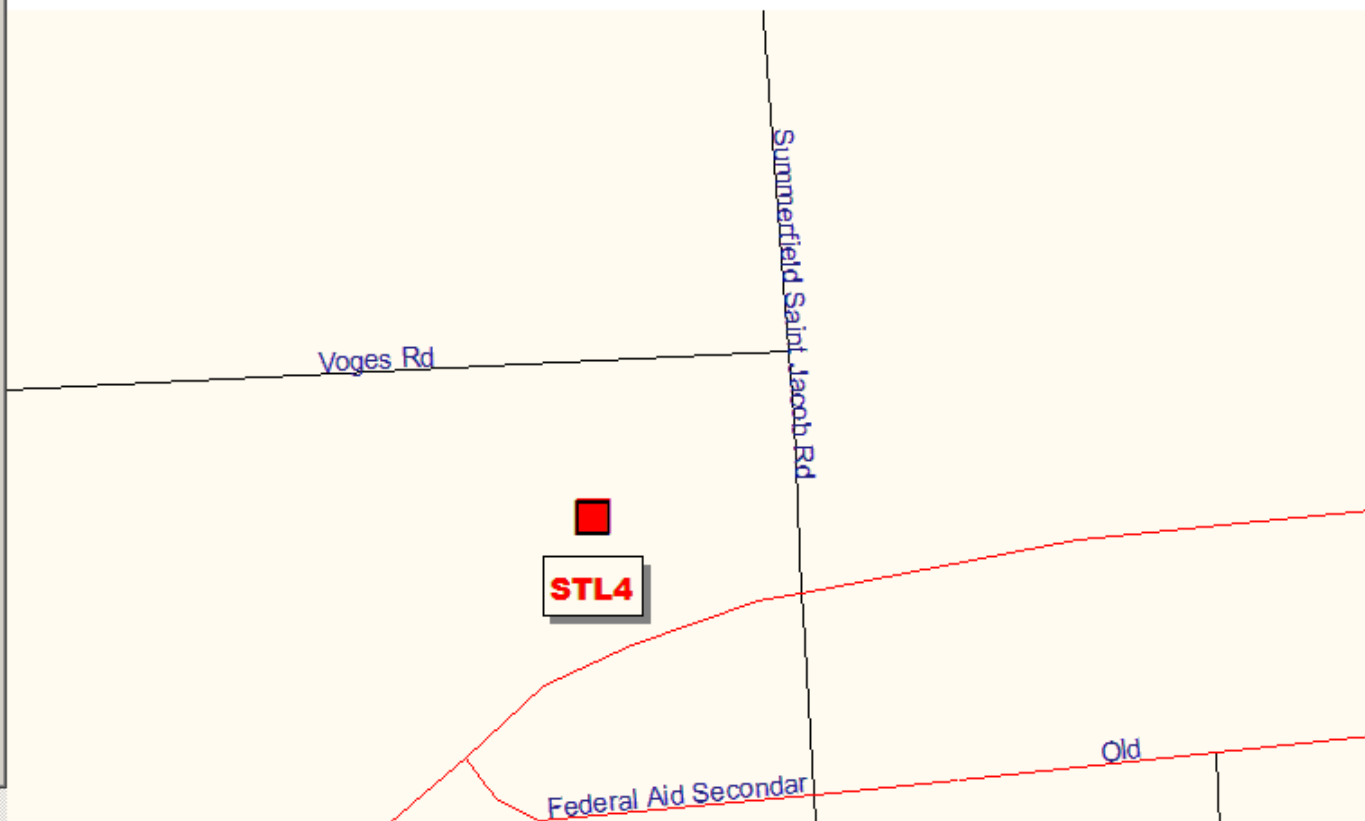

[Dynamic Map](#)
[Regional Map](#)
[Google Map](#)

Enter SiteID

CORS Home



National Geodetic Survey - CORS



Done

METADATA FOR A CORS SITE

- Coordinates (positions & velocities)
- Data availability profiles (charts showing times for which data has been collected)
- Data sheets (descriptive information)
- Log files (descriptive information)
- Site photos
- Time series of positional coordinates
- Google Maps



NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

CORS POSITION & VELOCITY (NAD 83)

BILLINGS 1 (BIL1), MONTANA

Retrieved from NGS DataBase on 01/10/01 at 09:45:16.

NAD_83 POSITION (EPOCH 1997.0)

Transformed from ITRF97 (epoch 1997.0) position in Sep. 2000.

X = -1372156.022 m latitude = 45 58 16.23742 N

Y = -4223946.947 m longitude = 107 59 47.29949 W

Z = 4563650.156 m ellipsoid height = 874.381 m

NAD_83 VELOCITY

Transformed from ITRF97 velocity in Sep. 2000.

VX = 0.0000 m/yr northward = 0.0000 m/yr

VY = 0.0000 m/yr eastward = 0.0000 m/yr

VZ = 0.0000 m/yr upward = 0.0000 m/yr

CORS POSITION & VELOCITY (ITRF)

BILLINGS 1 (BIL1), MONTANA

Retrieved from NGS DataBase on 09/25/00 at 12:27:27.

Antenna Reference Point(ARP): BILLINGS 1 CORS ARP

PID = AI7658

ITRF97 POSITION (EPOCH 1997.0)

Computed in Sept., 2000 using 12 days of data.

X =	-1372156.567 m	latitude	=	45 58 16.26213 N
Y =	-4223945.695 m	longitude	=	107 59 47.34150 W
Z =	4563650.195 m	ellipsoid height	=	873.698 m

ITRF97 VELOCITY

Predicted with HTDP_2.4 in Aug., 2000.

VX =	-0.0184 m/yr	northward	=	-0.0106 m/yr
VY =	-0.0020 m/yr	eastward	=	-0.0169 m/yr
VZ =	-0.0074 m/yr	upward	=	0.0000 m/yr

DATA AVAILABILITY PROFILE

SiteID-----GPS Date-----Zone-----Days

ashv

March 11, 2001 - day of year 070

EST

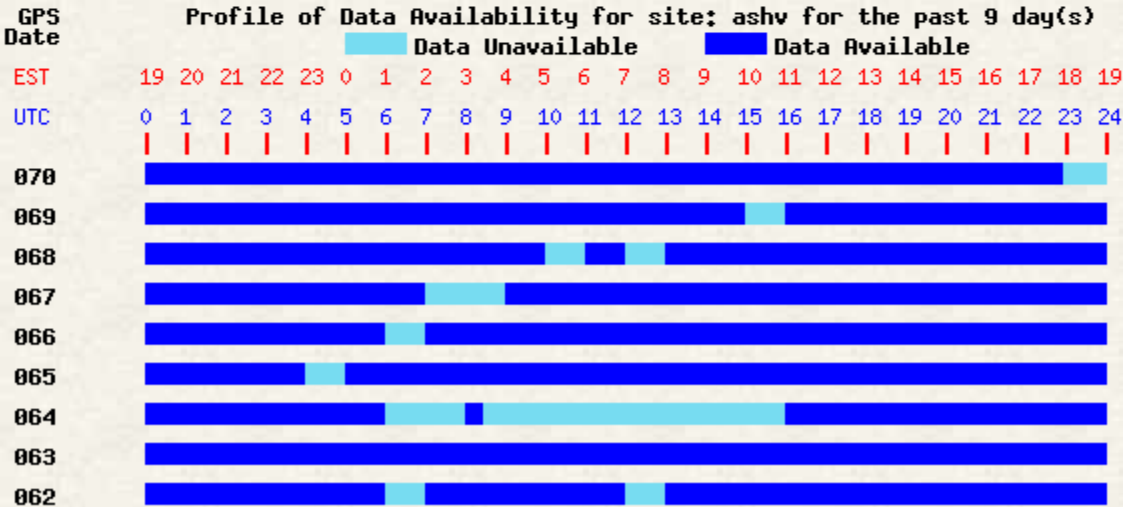
9

Submit

NOTE: Reset options and click 'Submit' to view data availability for another time period.

Get Customized Data

Get Uncustomized Data



BIL1 STATION LOG FILE

1. Site Identification of the GPS Monument

Site Name : Billings 1
Four Character ID : BIL1
Monument Inscription :
IERS DOMES Number : (XXXXXXXXXX)
CDP Number : (XXXX)
Date Installed : 25-AUG-2000 UT
Geologic Characteristic : (BEDROCK/CLAY/CONGLOMERATE/GRAVEL/SAND/etc)
Bedrock Type : (IGNEOUS/METAMORPHIC/SEDIMENTARY)
Bedrock Condition : (FRESH/JOINTED/WEATHERED)
Fracture Spacing : (1-10 cm/10-50 cm/50-200 cm/over 200 cm)
Notes : (multiple lines)
Additional Information : (multiple lines)

2. Site Location Information

City or Town : Billings
State or Province : Montana
Country : U.S.A.
Tectonic Plate : North American
Approximate Position
X coordinate (m) : -1372156.567
Y coordinate (m) : -4223945.695
Z coordinate (m) : 4563650.195
Latitude (deg) : 45.9712 N
Longitude (deg) : 107.9965 W
Elevation (m) : 873.698 (Ellip Ht)
Additional Information : ARP ITRF96 POSITION (EPOCH 1997.0) computed in
Sept. 2000 using 12 days of data.



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

BIL1 STATION LOG FILE

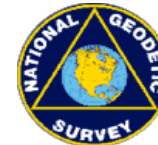
4. GPS Antenna Information

4.1 Antenna Type : ASH700829.3 SNOW
Serial Number : 14295
Antenna Height (m) : (m)
Antenna Reference Point : (ARP/BCR/BPA)
Degree Offset from North :
Antenna Radome Type :
Date Installed : 25-AUG-2000 UT
Date Removed : (dd-MMM-yyyy hh:mm UT)
Additional Information : Serial # added 23-MAY-2001

4.x Antenna Type :
Serial Number :
Antenna Height (m) : (m)
Antenna Reference Point : (ARP/BCR/BPA)
Degree Offset from North :
Antenna Radome Type :
Date Installed : (dd-MMM-yyyy hh:mm UT)
Date Removed : (dd-MMM-yyyy hh:mm UT)
Additional Information : (multiple lines)



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

CORS SITES PHOTO

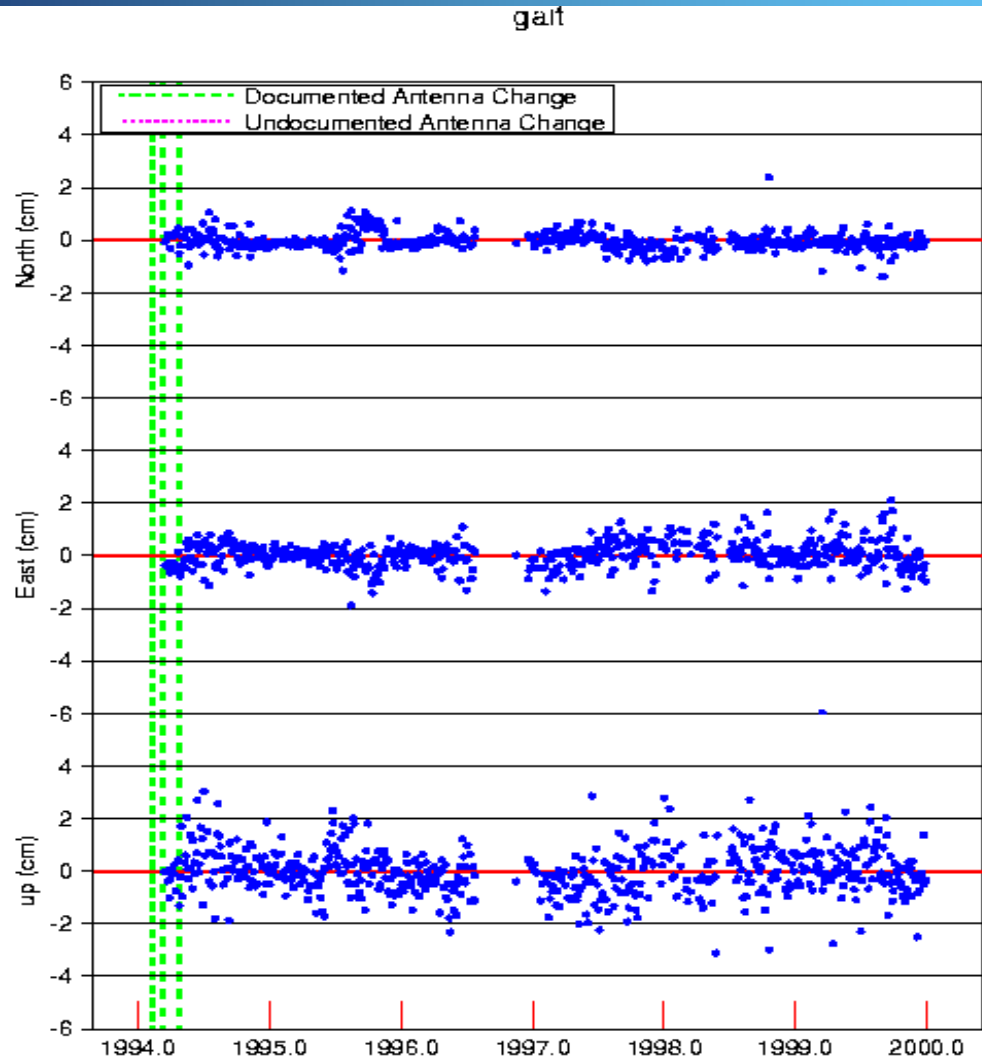


NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

Position Time Series (long-term)

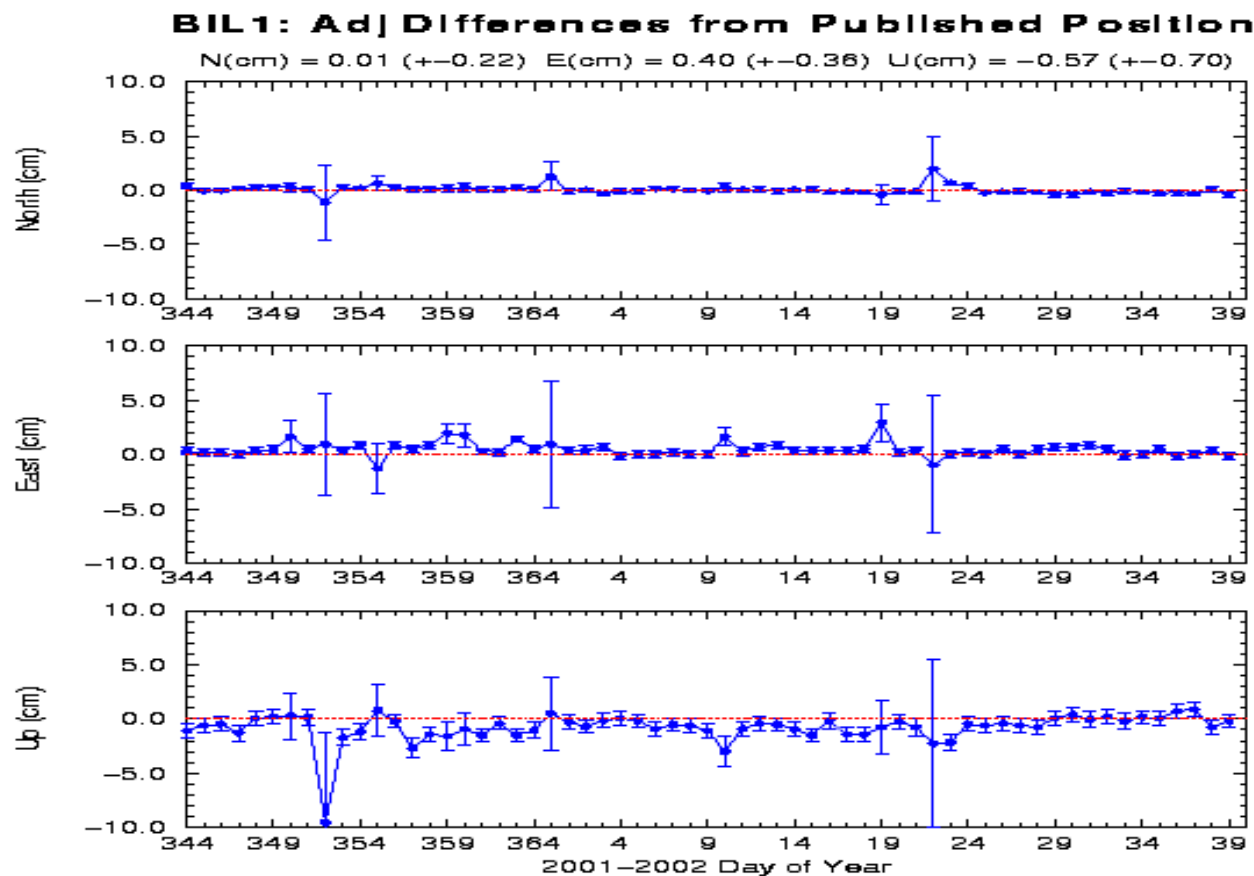


National Geodetic Survey

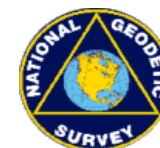


Positioning America for the Future

POSITION TIME SERIES (last 60 days)



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



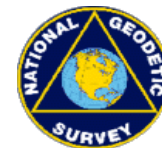
Positioning America for the Future

PRIMARY DATA FILES

- GPS observations at a CORS site
- Satellite orbits (ephemerides)



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

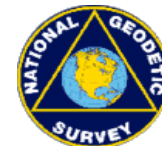
GPS Data – Rinex Format v2.20



- Data file spans
 - hourly, daily, customized (UFCORS)
- Data collection rates
 - 1sec, 5sec, 10sec, 15sec, and 30sec
- Data file life-time
 - hourly: 2 days + today
 - daily: permanently



NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

FILE NAMING CONVENTION

The RINEX file naming convention is as follows:

{SSSS}{DDD}{H}.{YY}{T}

where	SSSS	is the four character site identifier,
	DDD	is the day of year,
	H	is a letter which corresponds to an hour long UTC time block,
	YY	is the year,
	T	is the file type.

For daily files, the format would be **{SSSS}{DDD}0.{YY}{T}**.

Hour long UTC time block identifier (H):

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x

File type	Ending (T)
-----------	------------

Meteorological	m
----------------	---

Observation	o
-------------	---

Navigation	n
------------	---

Summary	s
---------	---



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

National Ocean Service

National Geodetic Survey





Positioning America for the Future

2	OBSERVATION DATA	G (GPS)	RINEX VERSION / TYPE
GPS Data Logger	GRDL	21-Mar-2001 00:00	PGM / RUN BY / DATE
Jamaica Met Service			COMMENT
			COMMENT
			COMMENT
JAMA			MARKER NAME
42601S001			MARKER NUMBER
CR	JamaicaMet		OBSERVER / AGENCY
UZ01603	ASHTECH UZ-12	UG00	REC # / TYPE / VERS
114	ROAD/M_TA_NGS	SNOW	ANT # / TYPE
1388123.458	-5909144.607	1951948.314	APPROX POSITION XYZ
0000	0000	0000	ANTENNA: DELTA H/E/N
1	1		WAVELENGTH FACT L1/2
5	C1	L1 L2 P1 P2	# / TYPES OF OBSERV
30			INTERVAL
2001	3	21 0 0 0	TIME OF FIRST OBS
2001	3	21 23 59 30	TIME OF LAST OBS
			END OF HEADER
01 3 21 0 0	0.0000000	0 11 24 6 30 23 9 26 17 10 18 5 4	
22525107.968	-12004584.60101	-9307794.83601	22525107.310 22525113.601
21407074.677	-21302765.63901	-16590892.08801	21407074.328 21407080.397
24273111.188	-6817866.50901	-5269844.90201	24273110.761 24273125.339
23992113.232	-5222731.73501	-4038165.96501	23992112.838 23992125.979
24740791.562	-3375069.26001	-2600636.54801	24740793.020 24740812.294
19829141.060	-28015349.71301	-21809187.84301	19829140.818 19829145.446
24987202.822	-3519780.28501	-2735504.94601	24987202.593 24987213.187
22285216.503	-15947032.36401	-11887374.74201	22285215.306 22285221.233
24749918.403	-652695.17911	-473382.45901	24749918.770 24749934.463
24264723.697	-3160535.55801	-2408534.86401	24264722.253 24264739.440
25147913.811	-9528713.53001	-7369147.23701	25147913.155 25147921.207

NGS Satellite Ephemerides

<http://www.ngs.noaa.gov/GPS/GPS.html>

-  NGS is one of the seven International GPS Service (IGS) Analysis Centers (AC) participating in the production of accurate GPS orbits:
- ③ Final Precise (~ 13 days latency)[accuracy < 4 cm]
 - ③ Rapid (17 hours latency) [accuracy < 5 cm]
 - ③ Ultra-Rapid (real-time) [accuracy < 25 cm]
-  Satellite positions in SP3 format are given (once every 15 minutes) in current ITRFxx frame



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



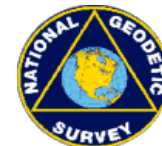
Positioning America for the Future

Three ways to download CORS Information

- Web-based User-Friendly CORS (UFCORS)
- Web-based “Standard” download
- FTP (File Transfer Protocol)



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
[National Geodetic Survey](#)



Positioning America for the Future

UFCORS/STANDARD


CORS - Continuously Operating Reference Stations - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.ngs.noaa.gov/CORS/

Getting Started Latest Headlines

CORS - Continuously Operating Refer...

 **National Geodetic Survey**

Products/Services Data Sheets Search

NGS NOAA

[opus](#) | [coop cors](#) | [map](#) | [dynamic map](#) | [newsletter](#) | [standard download](#) | [ufcors](#) | [cors ftp](#) | [coordinates](#)

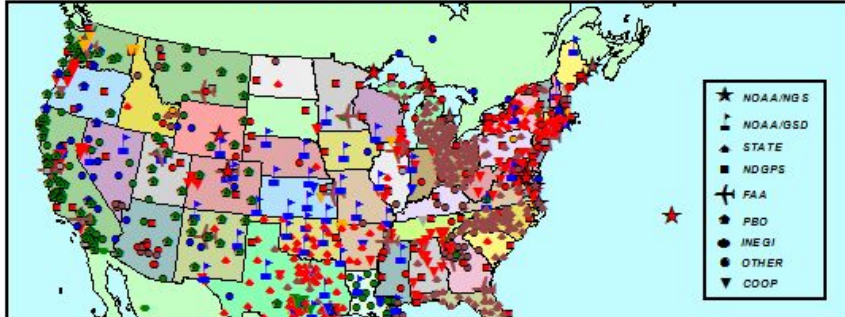
National Geodetic Survey - CORS

Continuously Operating Reference Stations

[What is CORS?](#) | [Notices](#) | [CORS Site Guidelines](#) | [Future Sites](#) | [List Sites](#)
[OPUS](#) | [User Friendly CORS](#)

Enter SiteID

CORS Coverage - November 2006



★ NOAA/NGS
▲ NOAA/GSD
■ STATE
◆ NDGPS
+ FAA
* PBO
● INEGI
● OTHER
▼ COOP

Done

Start Inbox for Richard.Snay... CORSWorkshop Microsoft PowerPoint - [...] txpr map - Mozilla Firefox CORS - Continuously ... << 2:00 PM

UFCORS: a Web utility enabling users to

- Obtain CORS data for an exact time interval
- Choose a sampling rate for the requested data
- Specify how the data files should be compressed
- Receive all associated data & metadata (coordinates, descriptive information, orbits)
- Receive information as soon as it is posted (GPS data are usually posted within an hour of the time these data are received by NOAA)

UFCORS - page 1

User Friendly CORS Version 3.5.2 - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.ngs.noaa.gov/UFCORS/

Getting Started Latest Headlines

User Friendly CORS Version 3.5.2

User Friendly CORS

Version 3.5.2 - November 01, 2004

This utility allows you to obtain a specific block of Global Positioning System (GPS) data for a continuously operating reference station (CORS) contained in the network of GPS sites managed by the National Geodetic Survey.

The GPS data will be in "receiver independent exchange" (RINEX) format, version 2.10.

**** NOTE: Whenever possible, please use the new Problem/Comment form below or at the bottom of the following page to report problems.**

UFCORS Page Info Trimble Products Configuration UFCORS Problem/Comment Form


Starting Day: January 22, 2007 - Day of year 22 [Get Older Data](#)

Start Time of the field observation: 09:00 [Day and Time Info](#)

Time Zone relative to observation location: Central Standard (GMT - 6) [Time Zone Info](#)

Number of hours of data you wish to receive: 1 Please LIMIT requests for 1-second sampling rate data to 2 hours.

CONTINUE CLEAR

 National Geodetic Survey - CORS Team
Last modified: November 01, 2004
Question or Comments: michelle.ho@noaa.gov

Done

Start Inbox for Richard.Snay... CORSWorkshop Microsoft PowerPoint - [...] User Friendly CORS v... 2:03 PM

UFCORS - page 2

User Friendly CORS Version 3.5.2 - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.ngs.noaa.gov/UFCORS/UFCORS2.jsp

Getting Started Latest Headlines

User Friendly CORS Version 3.5.2

User Friendly CORS

Version 3.5.2 - November 01, 2004

GPS data are available for the following sites for your specified time interval: [Site Info](#), [Site Map](#), [Data Availability](#), [Time Series](#)

This utility will interpolate or decimate the GPS data.

How many seconds do you want between individual data points?: Please LIMIT requests for 1-second sampling rate data to 2 hours.

Would you like the corresponding files?

Coordinate File:	<input type="text" value="no"/>	Coordinate File Info
Met File:	<input type="text" value="no"/>	Met File Info
NGS data sheet:	<input type="text" value="no"/>	
IGS Orbits in SP3 format:	<input type="text" value="yes"/>	Orbit File Info

Please choose the compression format.

Files can be compressed using [Compression Info](#)

Processing will take place within a minute. A window will appear after processing that allows you to select where on your hard drive to save the transmitted files. Also, a window displaying icons for several directories (folders) and files may appear. You may use this window to view the transmitted files. This feature is browser dependent and may not work on your browser.

To Report [UFCORS Problem or Comment Form](#)






National Geodetic Survey CORS Team

Done

Start Inbox for Richard.Snay... CORSWorkshop Microsoft PowerPoint - [...] User Friendly CORS V... 2:07 PM

CORS DATA - Mozilla Firefox

File Edit View Go Bookmarks Tools Help



http://www.ngs.noaa.gov/CORS/Data.html

Getting Started Latest Headlines

CORS DATA

ephemeris file is available for sites with no navigation file.

Mon, 22 Jan 2007 19:09:31 GMT (UTC)

Day of Year = 22

Please choose SITE, OPTION (and if necessary) DATE

SITE (sorted by state)	OPTION	YEAR
TX Galveston, TXGA	RINEX2 Data	2007
TX Glen Rose, TXGR	Data Availability	Month*
TX Hempstead, TXHE	Data Sheet	
TX Houston, ADKS	Coordinates (NAD83 & ITRF)	
TX Houston, LKHU	Logfile (Site logs)	
TX Houston, NETP	Local Map	
TX Houston, TXHU	Regional Map	January
TX Houston, ZHU1	Photo	Day*
TX Jacksboro, TXJA	Notices	
TX Jayton, JTNT	Time Series (60-day)	
TX Johnson City, TXJC	Time Series (longterm)	
TX Kaufman, TXKA	_____Non Site Specific_____	
TX Keene, TXKE	Global Navigation	1
TX La Marque, TXLM	IGS Ephemeris (precise,rapid or ultra-rapid)	
TX Laredo, TXLR	NGS Rapid Ephemeris	
TX Ledbetter, LDBT		
TX Liberty, TXLI		

Done

Standard Download

ACCESS TO CORS ARCHIVE VIA FTP

To access the CORS public directories, follow the steps below.

Type the “ftp” command followed by the Internet address as follows

ftp cors.ngs.noaa.gov



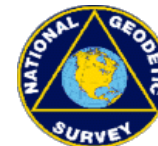
Respond to the following:

Name(cors.ngs.noaa.gov): **anonymous**

Password: **user@company.com**



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

FILE TRANSFER PROTOCOL (FTP)

FTP is a user interface to the File Transfer Protocol. FTP copies files over a network connection between the local ``client'' (user) computer and a remote ``server'' computer. FTP runs on the client computer.

The user's system must have access to the INTERNET and support the File Transfer Protocol (FTP). Some useful ftp commands are given below.

ascii	set ascii transfer type
binary	set binary transfer type
bye	terminate ftp session and exit
cd	change remote working directory
dir	list contents of remote directory
get	retrieve one file
help	print local help information
mget	retrieve multiple files
mput	send multiple files
prompt	force interactive prompting on multiple commands
put	send one file
quit	terminate ftp session and exit
show	display the contents of an ASCII file

*** Actual commands may vary among operating systems.**

DIRECTORIES

You will arrive at the ftp command level indicated by the prompt “ftp>”. If you have trouble, type “help” to print local help information or review the section **FILE TRANSFER PROTOCOL** for help with additional commands.

The following sub-directories contain additional files and information

- **coord** NAD83 and ITRF positional information.
- **graphics** CORS network maps.
- **itrf** Files on the IERS Terrestrial Reference Frame.
- **rinex** Rinex data files.
- **station_log** Station information, antenna specifications, and site contacts.
- **utilities** Programs for manipulating the RINEX files.



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

File Transfer Protocol (FTP)

```
Command Prompt - ftp ftp.ngs.noaa.gov

Z:\>ftp ftp.ngs.noaa.gov
Connected to www.ngs.noaa.gov.
220-***NOTICE***NOTICE***NOTICE***NOTICE***
220-
220-You have accessed a United States government computer.
220-This computer provides data and programs to customers of
220-the National Geodetic Survey via ftp and other protocols.
220-This use of this computer for these purposes is authorized
220-for all users.
220-
220-Use of this computer for purposes for which authorization
220-has not been extended is a violation of federal law and
220-can be punished with fines or imprisonment.
220-(public law 99-474)
220-
220-***NOTICE***NOTICE***NOTICE***NOTICE***
220-
220-
220 NGS FTP server ready.
User (www.ngs.noaa.gov:(none)): anonymous
331 Guest login ok, send your complete e-mail address as password.
Password:
230 Guest login ok, access restrictions apply.
ftp> bin
200 Type set to I.
ftp> prompt
Interactive mode Off
ftp> cd cors/rinex/2002/012/psu1
250 CWD command successful.
ftp>
```



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

File Transfer Protocol (FTP)

```
Command Prompt - ftp ftp.ngs.noaa.gov
220-(public law 99-474)
220-
220-***NOTICE***NOTICE***NOTICE***NOTICE***
220-
220-
220 NGS FTP server ready.
User <www.ngs.noaa.gov:(none)>: anonymous
331 Guest login ok, send your complete e-mail address as password.
Password:
230 Guest login ok, access restrictions apply.
ftp> bin
200 Type set to I.
ftp> prompt
Interactive mode Off .
ftp> cd cors/rinex/2002/012/psu1
250 CWD command successful.
ftp> ls
200 PORT command successful.
150 Opening ASCII mode data connection for file list.
psu10120.02o.gz
226 Transfer complete.
ftp: 17 bytes received in 0.00Seconds 17000.00Kbytes/sec.
ftp> cd ..
250 CWD command successful.
ftp> ls
200 PORT command successful.
150 Opening ASCII mode data connection for file list.
brdc0120.02n.gz
igr11486.sp3.gz
igu11486_00.sp3.gz
igu11486_12.sp3.gz
226 Transfer complete.
ftp: 74 bytes received in 11.56Seconds 0.01Kbytes/sec.
ftp>
```



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

FILE COMPRESSION FORMAT

RINEX files on the CORS file server are stored in a gzip compressed mode. These compressed files will have the extension .gz . An example is given below.

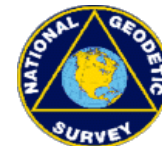
ais12330.98o.gz

All compressed files and executables should be transferred in binary mode. Text files should be transferred in ascii mode.

Before downloading files using the FTP protocol, set the transfer mode by typing “binary**” or “**ascii**” at the ftp prompt. Then use “**get**” or “**mget**” to retrieve the files.**



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

SOFTWARE / RINEX UTILITIES

Several DOS based utility programs are available to manipulate the RINEX data files. Versions also exist for other platforms such as Silicon Graphics (sgi), Sun Microsystems (sun), and Hewlett Packard (hp).

decimate.exe

Utility program to decimate 5 second data to a user specified rate.

gzip386.exe

Executable file which contains the utility "gzip.exe".

inflate.exe

Self-extracting utility program to uncompress files with the ".Z" extension.

interpo.exe

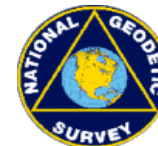
Utility program to interpolate between data epochs. Please read the documentation for this utility for more details.

join24pc.exe

Utility program to join two or more hourly RINEX observation or navigation files.



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future

INTERPO

Interpolate RINEX observational data at faster rates using Neville's algorithm for polynomial interpolation.

interpo -i <input file> -o <output file> [-s <start time> -e <end time>] -n <interpolation interval>

*** Fields between [] are optional.**

interpo -i ais1030a.96o -o ais1030a.out -n 5



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
National Ocean Service
National Geodetic Survey



Positioning America for the Future